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Scientific Activities of

the Government of Alberta

Overview 1989 – 90

Alberta
TECHNOLOGY, RESEARCH
AND TELECOMMUNICATIONS

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Science and Technology Expenditures

The Provincial Government invests in science and technology that supports its public policy objectives in health improvement, environmental protection, industrial and social development, and the advancement of local scientific competence. Its science agenda is the sum of the programs and budgetary allocations of several departments and agencies. Technology, Research and Telecommunications, in co-operation with Statistics Canada, conducts an annual survey of the Government's science activities. This appendix is a brief overview of the results of the 1989-90 survey.

On its own, this survey offers a series of indicators of Provincial Government expenditures, the allocation of those expenditures, human resources, and provincial priorities/objectives in the scientific arena. These provincial indicators can provide significant input to policy formulation and program evaluation when used in conjunction with the indicators generated from companion surveys (to be published at a later date), in particular those relating to the federal government, the private sector, universities and private non-profit institutions.

The term "indicator" is used deliberately. Specifically, a number of problems exist with data relating to science activities, including: definitions, year-to-year consistency and measurement. Consequently, the reader should be alerted to an estimated confidence interval of ± 15 per cent. It should also be noted that surveys involving different respondents (ie. funders vs performers) can yield substantially different results. While Technology, Research and Telecommunications and Statistics Canada are working to resolve these limitations, and while the data does offer reasonable order of magnitude estimates, caution is urged in drawing conclusions which exceed the rigor of the data.

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Objectives of Science Expenditures

Industrial development, health, social development and energy were the main targets of 1989-90 science expenditures. As described in Table 1, activities in fulfillment of these objectives accounted for 70 per cent of the year's science spending.

Furthermore, industrial development, health and energy were the focus of the Government's research and development agenda, absorbing 71 per cent of the total R&D expenditures. Related science activities (RSA) accounted for 25 per cent of Government spending in these three priority areas.

The priorities of industrial development were manufacturing and agriculture. These two objectives captured 89 per cent of the total expenditures in industrial and economic development. R&D activities were the major components in both of these objectives.

Energy science dollars were directed toward fossil fuel projects. Research and development activities constituted 85 per cent of total expenditures in fossil fuels research and 11 per cent of the year's total science dollars. Research expenditures related to health care ($36.8 million) were predominately financed by the AHFMR ($30.8 million).

Under social development, RSA accounted for 96 per cent of the total budget for this objective. The largest sub-component was culture, sport and recreation, which was primarily funded by Culture and Multiculturalism. The other sub-components included education, human resources, and urban and regional studies which together captured 24 per cent of the social development budget.

Table 1

Objectives of Science Expenditures of the Government of Alberta, 1989-90 ($ in '000s)

Objective	R&D	RSA	Total $	%
Industrial & Economic Development	**40,079**	**11,943**	**52,022**	**21.0**
agriculture	13,482	7,206	20,688	
fisheries	106	210	316	
forestry	1,493	532	2,025	
manufacturing	23,820	1,643	25,463	
other	1,178	2,352	3,530	
Health	**36,760**	**7,362**	**44,122**	**17.8**
Social Development	**1,819**	**41,563**	**43,382**	**17.5**
culture, sport and recreation	606	23,273	23,879	
education	367	4,465	4,832	
human resources	—	2,673	2,673	
urban and regional studies	—	2,663	2,663	
other	846	8,489	9,335	
Energy and Fuels	**27,987**	**5,097**	**33,084**	**13.4**
conservation	369	—	369	
fossil fuels	26,921	4,851	31,772	
renewable resources	697	—	697	
other	—	246	246	
Environmental Issues	**5,307**	**22,540**	**27,847**	**11.3**
land and information systems	655	14,100	14,755	
air	467	827	1,294	
land	1,878	2,078	3,956	
water	676	1,471	2,147	
other	1,631	4,064	5,695	
Transportation	**2,129**	**8,916**	**11,045**	**4.5**
Advancement of Science	**8,345**	**—**	**8,345**	**3.4**
Wildlife	**1,145**	**1,650**	**2,795**	**1.1**
Other	**24,670**	**—**	**24,670**	
Total	**148,241**	**99,021**	**247,262**	

Major Funders and Performers

Various departments and agencies shape the Government's science agenda as performers and/or funders of research and related activities. Those with science expenditures exceeding $1 million are listed in Table 2. The year's science agenda was largely the product of Technology, Research and Telecommunications (TRT), the Alberta Heritage Foundation for Medical Research (AHFMR) and the Alberta Oil Sands Technology and Research Authority (AOSTRA). Collectively, they accounted for 46 per cent of total expenditures. Note that these three organizations are essentially funders of research that is performed by the university and industry sectors.

Technology, Research and Telecommunications (TRT) was the main financier of manufacturing science and technology development, supplying $25 million toward that objective. Manufacturing technology development was performed mainly by industry and universities. The other major R&D performer funded by TRT was the Alberta Research Council, which received $25 million in grants and contributions from the Department in 1989-90.

The Alberta Heritage Foundation for Medical Research (AHFMR) has been the mainstay of medical research funding since its creation in 1979. Its awards to university scientists in 1989-90 accounted for 58 per cent of university-performed research. In relation to the Government's objective of health improvements, AHFMR awards constituted 70 per cent of the total health expenditure. Other participants in the health agenda included Environment, which used $3.7 million of its science budget for health-related research, and Health, which contributed $7 million. TRT, AADAC, and Occupational Health and Safety together contributed $2.7 million to the provincial health agenda.

The Alberta Oil Sands Technology and Research Agency (AOSTRA), is the major source of Government awards and contracts to industry for fossil fuels science and technology. About half of its 1989-90 research budget was delegated to the private sector. Alberta Energy shows a comparable reliance on industry. These two organizations provided $22.6 million, or 43 per cent of the total Government science dollars spent in the private sector.

The other departments and agencies listed in Table 2 are essentially performers, consuming two thirds to 95 per cent of their science budgets on intramural activities. In dollars, the largest science establishments within Government were: Culture and Multiculturalism; Forestry Lands and Wildlife; Agriculture; Environmental Centre; and Transportation and Utilities.

In the aggregate, the intramural expenditures of the Government absorbed 39 per cent of the year's science budget. Industry was the leading extramural performer, capturing 21 per cent of science expenditures; universities accounted for 19 per cent; the Alberta Research Council accounted for 13 per cent.

Table 2

Major Funders and/or Performers of the Government of Alberta's Science Agenda, 1989-90 ($ in '000s)

Department	Intramural	Industry	University	ARC	Other	Total
Technology, Research and Telecommunications	495	15,315	8,659	24,570	774	49,813
AOSTRA	4,934	16,775	4,856	4,432	1,229	32,226
AHFMR	1,569	500	26,811	—	1,932	30,812
Culture and Multiculturalism	17,652	—	—	—	5,166	22,818
Forestry, Lands and Wildlife	15,457	4,864	196	621	333	21,471
Agriculture	14,044	867	1,914	—	3,863	20,688
Environmental Centre	10,534	364	44	90	—	11,032
Transportation and Utilities	8,516	460	115	287	575	9,953
Energy	1,019	5,802	484	1,189	219	8,713
Health	2,847	504	1,155	—	2,441	6,947
Solicitor General	1,550	3,490	—	—	—	5,040
Environment	2,118	641	30	287	968	4,044
Municipal Affairs	3,326	575	75	—	64	4,040
Economic Development and Trade	2,706	494	5	—	7	3,212
Advanced Education	486	—	1,261	—	900	2,647
Education	1,418	104	260	5	327	2,114
Treasury	1,626	346	—	—	—	1,972
Labour	1,498	115	—	—	—	1,613
Career Development and Employment	1,237	213	7	—	197	1,654
Occupational Health and Safety	755	155	105	—	584	1,599
Tourism	591	630	—	—	75	1,296
Environmental Council	1,043	—	—	—	—	1,043
Other*	1,781	296	320	—	118	2,515
Total	**97,202**	**52,510**	**46,297**	**31,481**	**19,772**	**247,262**

* Includes AADAC, Attorney General, ACCESS Network, Family & Social Services, Recreation and Parks, and Special Waste Management Corporation.

There is a human resources component to the intramural science expenditures. Major employers of science personnel, those departments with 100 or more such employees, are shown in Table 3. As expected, the five departments with the largest in-house science budgets have the largest concentration of scientific talent. In 1989-90, they employed three out of four people in the Government's science work force.

Research and development personnel constituted 18 per cent of the Government's science professionals, technicians and auxiliary staff. In-house research and development tends to be concentrated in the natural sciences and engineering fields — the science capabilities most prominent in environmental and agricultural research. The vast majority (77 per cent) of science employees performed RSA. Their work spanned an array of information services such as technical/statistical surveys, mapping services, feasibility studies, testing and standards calibration. Throughout the 1980s, the Government's science work force has engaged predominately in RSA. Staff associated with the administration of external science programs comprised six per cent of the Government's science labour force.

Table 3

Science Personnel Employed by the Government of Alberta, 1989-90 (In Person-Years)

Department or Agency	R&D	RSA	AEP[1]	Total
Agriculture	141	272	12	425
Culture and Multiculturalism	—	292	—	292
Environment[2]	91	198	7	296
Forestry Lands and Wildlife	51	243	44	338
Transportation and Utilities	8	146	2	156
Other	56	364	51	471
Total	**347**	**1,515**	**116**	**1,978**

1. administration of external programs
2. includes the Centre, Department and Council

Scientific expenditures in 1989-90 were $1.4 million less than in 1988-89, a decrease of slightly over one-half per cent. Major declines occurred in the science budgets of AHFMR ($6.8 million), TRT ($3.2 million) and Environment ($2.5 million). These were offset by higher expenditures in the Departments of Energy ($4.2 million) and Culture and Multiculturalism ($3.8 million).

Historical revisions to the data resulted in two major changes. Firstly, a change in reporting resulted in an upward adjustment of $14 million to the science expenditures of Culture and Multiculturalism in 1988/89. Secondly, regrouping the data resulted in the creation of the sub-components "land information systems" under the objective "environmental issues." The dollar value of this new subcomponent was $15.8 million in 1988/89 and $14.8 million in 1989/90. Other changes to the historical data will be documented in future publications.

Incorporating the changes mentioned above, Table 4 tracks the annual science expenditures of the Provincial Government during the 1980s.

Table 4

Annual Science Expenditures of the Government of Alberta ($ in 000,000s)

Expenditures	1980-81	1982-83	1984-85	1986-87	1988-89	1989-90
Science	119.9	212.8	276.7	333.4	248.7	247.3

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